

FIXING SUPPORT FOR VEHICLE OPENING FRAME ACTUATING DEVICE

5 This invention relates to a fixing support assembly, making it possible in particular to fix a window or door actuating device in a vehicle opening frame. An opening actuating device is designed to ensure the opening and closing of a window or opening frame in a vehicle, such as a sunroof, a door or quarter window or an electric sliding door for example.

10 The term "window regulator" will be used hereafter to denote a window opening actuating device, whether for a door or quarter window or for a roof light, or for an opening frame such as a door or a sunroof.

 A window regulator in a door is described for example in document US 6 141 910. Such a window regulator comprises a motor driving a drum by means of a gear.
15 The drum drives the movement of a cable that actuates the movement of a window along a rail.

 For reasons of ease of handling and protection of the window regulator, the gear and the drum are generally arranged in a module. The module containing the drum and the gear can also include the motor and an electronic unit or have openings
20 for modular assembly with such components. Such a module is illustrated in document US 6 141 910. The module is closed by three screws arranged around the panels of the module surrounding the drum of the window regulator. These three screws make it possible to ensure satisfactory closing around the entire periphery of the module.

25 A window regulator is designed to be arranged in a vehicle opening frame for example in a car door or in the roof zone of a vehicle, or in a body component such as a vehicle's rear quarter panel. The following description, which relates to a vehicle door, can be transposed to the case of any opening frame or to the case of a rear quarter panel.

30 Two zones are defined in a vehicle door, separated by a supporting panel. These are a so-called wet zone, towards the outside of the vehicle, delimited by the body and the supporting panel, and a dry zone, towards the inside of the vehicle, delimited by the door lining and said supporting panel.

 A vehicle door contains numerous electronic and mechanical components,
35 including a window regulator device, a lock, audio equipment, etc. These components are arranged in the door and are generally fixed to the supporting panel either on the dry zone side, in particular for the electronic components, or on the wet zone side, for example the guide rails and the window actuation cable.

In the case of a window regulator device, it is preferable in certain cases for the drive motor and the electronic unit to be arranged in the dry zone whilst the drum and the drive cable of the window are arranged in the wet zone of the door. This arrangement of the window regulator device is in particular described in patent US 6 427 386.

It is then necessary to provide two parts to the window regulator device, namely the drum, the cable with the rails and the window to be arranged in the wet zone and the motor to be arranged in the dry zone, the motor nevertheless having to drive the drum of the window regulator.

This constraint on the arrangement of the components of the window regulator complicates the mounting of the window regulator actuating device in the door.

The invention proposes a fixing support assembly, making it possible in particular to simplify the mounting of a window regulator or door actuating device in a vehicle opening frame.

The invention proposes a fixing support assembly comprising:

- a supporting element comprising a first part and a second part which are essentially planar and parallel, at least one of the first or second parts comprising at least one retaining member;
- a fixing element comprising a nut equipped with a stop.

According to one characteristic, at least one of the first or second parts of the supporting element comprises at least one fixing clip.

According to one characteristic, one of the first or second parts of the supporting element comprises a housing designed to receive the fixing element.

According to one embodiment, the stop of the fixing element is designed to remain captive in said housing.

According to one characteristic, the supporting element has an opening passing through it, situated essentially in the centre thereof.

According to one characteristic, the supporting element is made of moulded plastic.

The invention also relates to a vehicle opening frame comprising:

- a dry zone;
- a wet zone separated from the dry zone by a supporting panel;
- a fixing support assembly according to the invention, fixed to the supporting panel, the first part of the supporting element being arranged in the wet zone and the second part of the supporting element being arranged in the dry zone.

According to one application, the opening frame comprises a window regulator or door actuating motor fixed to the second part of the supporting element.

According to one embodiment, the motor is retained by at least one retaining member arranged on the second part of the supporting element.

According to one embodiment, the motor is fixed to the supporting panel by means of a single screw cooperating with the fixing element.

5 According to one embodiment, the motor comprises a casing comprising a bore designed to receive the screw and a part of the fixing element.

According to one embodiment, the bore has a first section having a first diameter and a second section having a second diameter greater than said first diameter, said second section of the bore being designed to receive at least one part
10 of the nut of the fixing element.

According to one embodiment, the bore also has an alignment section adjacent to the second section.

The invention also relates to a method for mounting a window regulator or a frame actuating motor on a supporting panel of a vehicle opening frame, said panel
15 separating a dry zone from a wet zone, the method comprising steps consisting of:

- fixing a fixing support assembly according to the invention to the supporting panel, the first part of the supporting element being arranged in the wet zone and the second part of the supporting element being arranged in the dry zone;
- 20 - holding the motor on the second part of the supporting element of said fixing support assembly;
- adjusting the position of the motor rotatably about a drive axis;
- fixing the motor to said supporting panel in a rotation stop position about said drive axis by means of the fixing element of said fixing support
25 assembly.

According to one characteristic, the stage of fixing the motor to the supporting panel is carried out by means of a screw designed to draw the nut of the fixing element into a bore provided in a casing of the motor.

Other characteristics and advantages of the invention will become apparent on
30 reading the following detailed description of the embodiments of the invention, given as an example only and with reference to the drawings, which show:

- Figure 1, a diagram of a window regulator actuating device fixing support assembly according to the invention;
- Figure 2a, a diagrammatic view of the fixing element of the assembly in
35 Figure 1, in mounted position;
- Figure 2b, a diagrammatic view of the fixing element of the assembly in Figure 1, in immobilization position;

- Figure 3, a diagram of a supporting panel comprising the fixing support assembly according to the invention;

- Figure 4, a diagram of a window regulator actuating motor fixed with the fixing support assembly according to the invention.

5 According to the invention, a fixing support assembly comprises a supporting element and a fixing element. The supporting element comprises a first part and a second part, which are essentially planar and parallel. At least one of the parts of this supporting element comprises at least one retaining member, designed to retain a component to be fixed, for example a window regulator or door actuating device.
10 The fixing element comprises a nut equipped with a stop, designed to ensure the fixing of the support and of the component to be fixed to a panel, for example in a vehicle door.

Figure 1 is a diagram of a fixing support assembly according to the invention. Such an assembly comprises a supporting element comprising a first part 10 and a
15 second part 20, and a fixing element 30.

Parts 10 and 20 of the supporting element are essentially planar and parallel. The supporting element is designed to be fixed to a panel with a hole through it, with the first part 10 on one side of the panel and the second part 20 on the opposite side of this panel.

20 The supporting element can be made of moulded or machined plastic. The two parts 10 and 20 of the supporting element can be made in a single element.

One of the parts 10 of the supporting element (the first part 10 in Figure 1) can comprise fixing clips 12 making it possible to fix the supporting element to a panel. The supporting element can however be fixed to the panel by any other suitable
25 means, such as screwing or gluing, or a combination of these means.

One of the parts 20 of the supporting element (the second part 20 in Figure 1) comprises at least one retaining member, for example two hooks 21, 21' designed to retain a component to be fixed. The retaining member can take any other suitable form, for example an arc-shaped groove.

30 According to one embodiment, the clips 12 and the hooks 21 can be arranged on the same part 10 or 20 of the supporting element.

The supporting element can also have an opening 15 passing through it, situated essentially in the centre of the element. This opening 15 makes it possible to operationally connect a component, such as a window regulator motor for example,
35 fixed to the second part 20 of the supporting element, to a component arranged on the other side of the panel to which the supporting element is fixed, for example a cable drive drum. A drive axis 70 can be defined as the axis perpendicular to the

plane of the supporting element passing essentially through the centre of the opening 15 in said element.

The support assembly according to the invention also comprises a fixing element 30 comprising a nut 31 equipped with a stop 32. This fixing element 30 is designed to ensure the fixing of a component, such as a motor casing, to the second part 20 of the supporting element.

One of the parts 10, 20 of the supporting element can have a housing 11 designed to receive the fixing element 30. In Figure 1, the housing 11 is provided in the first part 10, but it would be equivalent to provide it in the second part 20 of the supporting element.

According to one embodiment, the stop 32 of the fixing element 30 can remain captive in this housing 11. The housing 11 however has a screw hole 23 passing through it opening onto the surface of the other part 20 of the supporting element, in order to allow the nut 31 of the fixing element to open on the side of this other part 20 (i.e. the second part in Figure 1). It is understood that such a screw hole 23 is provided in the supporting element according to the invention even in the absence of a housing 11 for the fixing element. Preferably, the screw hole 23 passes through the first 10 and second 20 parts.

By retaining the stop 32 in a housing 11 of a part 10 of the supporting element, it is possible to retain the fixing element 30 integral with the supporting element and pre-position the nut 31 for more rapid fixing of a component to the supporting element.

Figures 2a and 2b diagrammatically illustrate the fixing of a component, for example a motor casing 50, to the supporting element according to the invention by means of the fixing element 30 according to the invention.

In Figure 2a, the casing 50 is in the fixing position. The nut 31 and the stop 32 of the fixing element are in the housing 11 of the first part 10 of the supporting element.

In Figure 2b, the casing 50 is in the immobilization position. The nut 31 has been drawn, by a screw 40, into a bore 52 provided in the casing 50 whilst the stop 32 has remained captive in the housing 11.

The component 50 to be fixed by means of the support assembly according to the invention can advantageously be provided with a particular bore 51, 52, 53 making it possible to facilitate the alignment of the element to be fixed with the fixing nut 31. The particular bore provided in the component 50 to be fixed comprises a first section 51 having a first diameter d_1 and a second section 52 having a second diameter d_2 greater than said first diameter d_1 . This second section 52 of the bore is designed to receive at least one part of the nut 31 of the fixing element 30.

The bore can comprise a widened alignment section 53 adjacent to the second section 52.

The first section 51 of the bore allows for the insertion of a screw 40 that reaches the nut 31. Under the effect of screwing, the screw 40 draws the nut 31 into the second section 52 of the bore until the stop 32 is placed against the screw hole 23.

The fixing support assembly according to the invention can be used particularly advantageously for mounting a window regulator in a vehicle door.

Figure 3 diagrammatically illustrates a supporting panel 100 forming a separation between a dry zone A and a wet zone B in a vehicle door or body part such as a rear quarter panel.

The supporting panel 100 has an opening 15' passing through it, making it possible to slide the supporting element according to the invention in order to place a first part 10 in the wet zone B and a second part 20 in the dry zone A.

The opening 15' has dimensions greater than the opening 15 of the supporting element. However, the dimensions of this opening can be minimized in order to limit the problems of sealing between the two zones A and B separated by the panel 100.

A motor 60, shown in Figure 4, can then be fixed to the second part 20 of the supporting element on the side of the dry zone A. The motor 60 can be simply retained by the retaining member(s) 21 of the second part 20 in a partially fixed state. The motor 60 can then be fixed by means of a single screw 40 cooperating with the fixing element 30.

In the embodiment illustrated, the retaining members are two hooks 21, 21'. The screw hole 23 designed to allow the cooperation of the screw 40 with the fixing element 30 can then be provided essentially equidistant from the two hooks 21, 21'. The motor 60 is thus fixed at three points against the supporting element according to the invention. Such a fixing fully secures the motor 60 on the supporting panel 100 whilst allowing easy access for dismantling if necessary, the screw 40 also being situated on the side of the dry zone A of the panel 100.

The motor 60 has a gear casing 50 with which a worm 55 engages. The casing 50 can be machined in order to have a bore 51, 52, 53 as described with reference to Figures 2a and 2b. The casing 50 can also be machined, for example with flat sections, so as to cooperate with the shape of the retaining members 21 provided on the second part 20 of the supporting element.

When the casing 50 is placed on the second part 20 of the supporting element and retained by the hooks 21, 21', the centring does not have to be perfect. The casing 50 can be turned about the axis 70 so as to position the widened part 53 of the bore opposite the screw hole 23 of the supporting element.

A screw 40 is then introduced into the first section 51 of the bore and when the nut 31 has been drawn into the second section 52 of the bore, the motor can no longer rotate freely about the axis 70. The screw 40 and the nut 31 are then tightened in order to place the stop 32 against the supporting element and in order to remove
5 any degree of freedom from the casing 50 of the motor 60.

The location of the bore 51, 52, 53 on the motor casing 50 also allows for the satisfactory positioning of the axis of the motor relative to the axis 70. This axis 70 coincides with the drive axis of a drum designed to also be fixed to the element, in the wet zone B. The axle spread between the drive axis of the drum 70 and the axis
10 of the worm 55 of the motor can therefore be well controlled. Preferably, the bore of the casing 50 is provided in proximity to the worm 55 of the motor.

Moreover, the nut 31 allows for the reaction torque of the motor 60 in operation to be withstood. A window regulator motor applies approximately 3m/N of reaction to the element to which it is fixed. With time, this reaction torque can cause
15 play in the attachment of said supporting element. Within the scope of this invention, this reaction torque is absorbed by the screw 40 and the nut 31, the screw threads of which are such that the reaction torque contributes to the tightening of the fixing. The stop 32 is therefore held in the immobilization position (Figure 2b) during the operation of the motor.

20 Of course, this invention is not limited to the embodiments described as an example; thus, the shapes of the fixing supporting element and its location can vary depending on the components to be fixed and their arrangement in the dry and wet zones of a vehicle door or rear quarter panel.

In particular, the invention has been described with a fixing element situated in
25 the wet zone and screwing from the dry zone, but the reverse can also be implemented without exceeding the scope of the invention. In general, the terms first and second parts in the description can be reversed without exceeding the scope of the invention.